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Manufacture of Spirit and Fermented Liquors.

LETTERS PATENT to John McGaan, of 38, Dale Street, Liverpool, for an Invention of "IMPROVEMENTS IN THE MANUFACTURE OF SPIRIT AND FERMENTED LIQUORS."

PROVISIONAL SPECIFICATION left by the said John McGaan at the Office of the Commissioners of Patents on the 5th February 1880.

JOHN MCGAAN, of 38, Dale Street, Liverpool. "IMPROVEMENTS IN THE MANUFACTURE OF SPIRIT AND FERMENTED LIQUORS."

This Invention has for its object improvements in the manufacture of spirit and fermented liquors.

At the present time spirit is sometimes produced from maize, but there are difficulties in the process, especially in respect to the disposal of the residues.

Now according to my Invention in place of using maize I employ a glucose prepared from maize, or it might be from other grain, but it is most economically prepared from maize, and in order to ferment this glucose until the whole or practically the whole of it is converted into spirit I employ yeast together with mineral salts and material suitable to nourish the yeast.

For this purpose ammoniacal tartrate, potassic phosphate, calcic phosphate, magnesia sulphate are suitable. By this addition to glucose of substances suitable to nourish the yeast and to maintain its activity I am able to ferment glucose by itself to the extent of complete conversion, whereas heretofore this has not been practicable.

Glucose has already, I would remark, been used by brewers, but they have only been able to employ it together with malt in large proportion, and this notwithstanding that for brewing the complete conversion of the saccharine into spirit is not desired.

The addition to the glucose according to my Invention of salts suitable to nourish the yeast will enable brewers to make use of glucose in any proportion they may consider desirable.

[*Price 4d.*]

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said John McGaan in the Great Seal Patent Office on the 5th August 1880.

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At the present time spirit is sometimes produced from maize, but there are difficulties in the process, especially in respect to the disposal of the residues.

Now according to my Invention in place of using maize I employ a glucose prepared from maize, or it might be from other grain, but it is most economically prepared from maize, and in order to ferment this glucose until the whole or practically the whole of it is converted into spirit I employ yeast together with materials suitable to nourish the yeast.

By this addition to glucose of substances suitable to nourish the yeast and to maintain its activity I am able to ferment glucose by itself to the extent of complete conversion, whereas heretofore this has not been practicable.

The wash or fermented liquor thus obtained when distilled yields spirit.

In order that my said Invention may be most fully understood and readily carried into effect, I will proceed to describe the method in which it is preferred to conduct the manufacture.

The glucose which I employ is readily obtainable in the market. It is usually made from maize by digesting the meal of this grain under pressure with dilute sulphuric acid. Practically the whole of the starch of the meal is thus converted. Afterwards the acid is neutralized, and the glucose solution is evaporated to facilitate transport.

I take glucose as it is found in commerce; it should be a sample in which practically complete conversion has been effected; or I manufacture a glucose for my use by the known processes.

I dissolve this glucose in water. To ferment the solution I employ yeast, which I add in the proportion of three quarters of a part by weight of well drained yeast for every hundred parts of glucose; also as a yeast food I add the clear extract or wort obtained by mashing from five to ten parts of malt. The liquor should be set for fermentation at a temperature of about 25° C., and at a specific gravity of 1·055 (water being 1·000).

Malt extract is the yeast food which I generally find to be the best, but I can also employ mineral salts. Thus the addition to the glucose solution of the following salts will be found to cause the yeast to be nourished in a satisfactory manner:—

Potassium acid phosphate - -	1·30 parts.
„ carbonate - - -	0·86 „
„ silicate - - -	0·04 „
Ammonium dextrotartrate - -	1·50 „
Ferrous sulphate - - - -	0·17 „

Or in the above mixture of salts I sometimes substitute for the ammonia dextrotartrate,—

Potassium nitrate - - -	1·00 parts.
And „ bitartrate - - -	1·00 „

The fermentation will be found to occupy about three days. At the end of this time the wash will be ready for distillation.

The fermented liquor or wash produced is of a very pure nature and of an agreeable flavour. With the addition of flavouring matters or mixed with other fermented liquors it may be used as a beverage.

The spirit obtained by distillation of the wash is of a finer quality than that which results from the distillation of a wash prepared by mashing maize meal with malt, as is sometimes done at present, and in addition a greater yield of spirit is obtained from a given quantity of maize. An advantage also of the highest importance is that the manufacture of spirit may by this Invention be carried on where there are no facilities for the disposal of residues. This applies whether malt extract or wort or mineral salts be employed, as the yeast food for the extract or wort may be prepared at a distance in a concentrated form and packed in casks for conveyance to the distillery.

In place of yeast a wine ferment may be employed where this is more readily obtainable.

At the present time when maize meal is used by distillers and mashed with malt to produce a wort, a preliminary treatment of the maize meal with dilute acid, but without pressure, is sometimes resorted to. The advantage of this treatment is that it causes the wort produced by the mashing to separate from the residue much more freely than it otherwise would. This acid treatment however also has the effect of converting an insignificant proportion of the starch of the meal into glucose, but the great bulk of the starch is always converted by the mashing operation with malt into maltose and dextrine, the latter of which is as far as the distiller is concerned, a useless product.

Glucose has already, I would also remark, been used by brewers, but they have only been able to employ it together with malt in large proportion, and this notwithstanding that for brewing the complete conversion of the saccharine into spirit is not desired.

Having thus described the nature of my said Invention and the manner of performing the same, I would have it understood that I claim,—

First. The manufacture of spirit from glucose (as the same is found in commerce) by distilling a wash prepared by dissolving the said glucose in water and fermenting it by the addition of yeast food and yeast or like ferment, substantially as described.

Second. The manufacture of a fermented liquor or wash from glucose without putting it through any mashing operation, but by fermenting it with the aid of yeast food and yeast or like ferment, substantially as described.

Third. The manufacture of spirit by the process substantially as herein described, by which process maize or other starch containing material is made to yield spirit without being put through any mashing operation, but by the starch being converted into glucose, and the glucose fermented with the aid of yeast food and yeast or like ferment.

In witness whereof, I, the said John McGaan, have hereunto set my hand and seal, this Second day of August, in the year of our Lord One thousand eight hundred and eighty.

JNO. McGAAN. (L.S.)

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